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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------|-------------|----------------------|---------------------|------------------|
| 09/785,282 | 02/20/2001 | Raymond Duchesne | DIGI8 | 4216 |
| 7590 | 10/09/2003 | | EXAMINER | |
| William S. Ramsey | | | PUENTE, EMERSON C | |
| 5253 Even Star Place | | | | |
| Columbia, MD 21044 | | | ART UNIT | PAPER NUMBER |
| | | | 2184 | |
| DATE MAILED: 10/09/2003 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/785,282 | DUCHESNE ET AL. |
| | Examiner Emerson C Puente | Art Unit 2184 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 February 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 9 and 10 is/are allowed.
- 6) Claim(s) 1-8, 11 and 12 is/are rejected.
- 7) Claim(s) 1-12 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892).
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) Interview Summary (PTO-413) Paper No(s). _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Specification

Specification is objected to because of the following informalities:

Please change "identify" to "identity" (see page 13 line 2 of specification).

Appropriate correction is required.

Claim Objections

Claim 1-12 are objected to because of the following informalities:

In regards to claim 1, the variable "n" is indefinite. Please change to include an appropriate range for "n" (see line 3 and 4 of claim).

In regards to claim 2, please change "devices" to "units" (see line 1 of claim).

In regards to claim 9, the phrases "the heartbeat" (see line 3 of claim) and "the DASD" (see line 10 of claim) lacks antecedent basis.

In regards to claim 11, the phrases "the heartbeat" (see line 3 of claim) and "the DASD" (see line 10 of claim) lacks antecedent basis.

The remaining claims, not specifically mentioned, are objected to because they are dependent upon one of the claim mentioned above.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,073,218 of DeKoning et al. referred hereinafter "DeKoning".

In regards to claim 1, DeKoning discloses a RAID system able to function with undiminished capacity despite the failure of any storage array controller comprising:

n active storage array controller (see figure 11 and column 22 lines 50-60);

n arrays of storage units, each active storage array controller connected by at least one connector to one array of storage units (see figure 11 and column 22 lines 50-60),

each active storage array controller controlling one or more arrays of storage units, and one only passive storage array controller (see figure 11 item 118.6),

the passage storage array controller connected by at least one connector to each active storage array controller (see figure 11 item 150 and column 22 lines 50-60),

the passage storage array controller able to control any one of the arrays of storage devices in the case of failure of an active storage array controller (see column 9 lines 20-25)

In regards to claim 2, DeKoning discloses a RAID system able to function with undiminished capacity despite the failure of a storage array controller comprising:

three active storage array controllers (see figure 11 items 118.1, 118.2, 118.3 and column 22 lines 50-60),

three arrays of storage devices (units) (see figure 11 items 108.1, 108.2, 108.3), each active storage array controller connected by at least one connector to and controlling one or more arrays of storage units (see column 9 lines 5-7 and column 22 lines 30-40)

each array of storage units comprising a multiplicity of storage units and at least one connector between each storage unit and the active storage array controller which controls that array (see figure 11 item 108 and 118), each array comprised of a multiplicity of active storage array units and one or more parity storage units (see column 7 line 62 to column 8 line 13),

one passive storage array controller (see figure 11 item 118.6)

each active storage array controller connected by at least one connector to the passive storage array controller (see figure 11 item 150 and column 22 lines 50-60), and

the passive storage array controller able to assume the identity of a failed active storage array controller and to control the at least one array of storage units controlled by the failed active storage array controller (see column 9 lines 20-25 and column 22 lines 27-30)

In regards to claim 3 and 5, DeKoning discloses wherein two connectors connect each storage unit with one storage array controller (see figure 11 items 150.1,150.2 and column 22 lines 50-60).

In regards to claim 4 and 6, DeKoning discloses wherein one connector connects each storage unit with each of greater than one storage array controller (see figure 11 item 150.1 or 150.2 and column 22 lines 50-60).

In regards to claim 7 and 8, DeKoning discloses wherein each active storage array controller is connected by at least one connector to two adjacent active controller, forming a ring of active storage array controllers (see figure 11 and column 22 lines 50-67 and column 23 lines 1-21).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over US Chung in view of US Patent No. 5,928,367 of Nelson et al. referred hereinafter "Nelson" in further view of US Patent No. 6,343,324 of Hubis et al. referred hereinafter "Hubis".

In regards to claim 11, Nelson discloses maintaining the channel capacity of a storage system when an active storage array controller fails comprising the steps of:

ceasing the emission of the heartbeat by a defective active storage array controller (see column (see column 9 lines 30-35);

detecting the cessation of the heartbeat by a defective active storage array controller and emission of an activation signal by a passive storage array controller (see column 9 lines 30-35);

assuming the identity of the defective active storage controller by the passive storage array controller (see column 9 lines 45-50);

Art Unit: 2184

It is inherent identifying the DASD of the defective storage array controller by the passive array controller and assuming control of the DASD of the defective storage array controller by the passive storage array controller. Nelson discloses a storage management system comprising of storage devices and disk array (DASD), indicating the master or primary controller controls the DASD. Since the slave or passive controller assumes the identity of the master or primary control during the cessation of a heartbeat signal (see figure 5 item 12 and 15 and column 10 lines 35-45), it therefore must be able identify the DASD of the defective storage array controller by the passive array controller and assuming control of the DASD of the defective storage array controller by the passive storage array controller.

However, Nelson fails to disclose:

a RAID system
a table on each DASD used to identify the DASD of the defective storage array controller by the passive array controller

Hubis discloses:

a RAID system (see column 5 lines 1-5).
a table on each DASD used to identify the DASD of the defective storage array controller by the passive array controller (see column 18 lines 22-31).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a RAID system. A person of ordinary skill in the art would have been motivated to make the modification because Nelson discloses a disk storage system and a RAID system constitutes a disk storage system. Furthermore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to identifying the DASD of the defective storage array controller by the passive array controller using a table on each DASD. A person of ordinary skill in the art would have been motivated to make the modification because Nelson discloses assuming control of the DASD of the defective storage array controller and using a table on each DASD with Volume Mapping information, as per teachings of Hubis, enables assuming control of the DASD of the defective storage array controller by the passive storage array controller (see column 18 lines 22-31).

In regards to claim 12, Nelson discloses emitting a defective storage array controller signal by the reporter storage array controller or the passive storage controller (see column 9 lines 60-65)

Allowable Subject Matter

Claims 9 and 10 are objected to for reasons stated in claim objections, but would be allowed if modified to eliminate informalities disclosed in claim objections.

Examiner's Statement of Reason for Allowance

The following is an Examiner's statement of reasons for the indication of allowable subject matter: Claim 9 is allowable over the prior art of record because the Examiner found neither prior art cited in its entirety, nor based on the prior art, found any motivation to combine any of the said prior arts.

The primary reason for allowance for claim 9 is the inclusion of emission of an activation signal by a reporter active storage array controller and detecting the activation signal by a passive array controller in conjunction with the rest of the limitation set forth in the claim.

The remaining claim, not specifically mentioned, is allowed because they are dependent upon one of the claim mentioned above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

See Form PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Emerson Puente, whose telephone number is (703) 305-8012. The examiner can normally be reached on Monday-Friday from 8:00AM- 5:00PM, first Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *Robert Beausoliel*, can be reached on (703) 305-9713 or via e-mail addressed to [*robert.beausoliel@uspto.gov*]. The fax number for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Communications via Internet e-mail regarding this application, other than those under 35 U.S.C. 132 or which otherwise require a signature, may be used by the applicant and should be addressed to [*emerson.puente@uspto.gov*].

All Internet e-mail communications will be made of record in the application file. PTO employees do not engage in Internet communications where there exists a possibility that sensitive information could be identified or exchanged unless the record includes a properly signed express waiver of the confidentiality requirements of 35 U.S.C. 122. This is more clearly set forth in the Interim Internet Usage Policy published in the Official Gazette of the Patent and Trademark on February 25, 1997 at 1195 OG 89.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 305-3900.

Emerson Puente

10/6/03

Robert Beausoliel
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